Listing of Claims:

Claims 1 (original) A cell element of a laminated cell array for the electrowinning of metal from metal ion solutions, comprising an anode shell and a cathode shell separated by an insulating diaphragm, the anode shell delimited by an anodic plate provided with at least one conductive protrusion for transmitting direct electric current to an anode, the anode shell delimited by a cathodic plate provided with at least one draft tube capable of establishing a spouted bed of metallic beads, said diaphragm being provided with perforations in correspondence of said spouted bed of metallic beads allowing the free circulation of the electrolyte while hindering the passage of said metallic beads from the cathode compartment to the anode compartment.

Claim 2 (original) The cell element of claim 1 wherein said at least one conducting protrusion is shaped as a rib.

Claim 3 (original) The cell element of claim 2 wherein said ribs have a first major surface whereto said anode is secured, and a second major surface provided with a contact strip, said contact strip being welded to said anodic plate.

Claim 4 (currently amended) The cell element of ~~claims 2 or 3~~ claim 2 wherein said anode shell further comprises rib-shaped spacers.

Claim 5 (currently amended) The cell element of ~~the previous claims~~ claim 1 wherein said cathode shell is constructed from an array of bars.

Claim 6 (original) The cell element of claim 5 wherein said bars are rectangular-shaped.

Claim 7 (currently amended) The cell element of ~~the previous claims~~ claim 1 wherein said cathode shell comprises at least one window for inspection.

Claim 8 (currently amended) The cell element of ~~the previous claims~~ claim 1 wherein said anode shell and said cathode shell comprise peripheral flat regions such as frames or flanges for fastening said anode shell to said cathode shell.

Claim 9 (currently amended) The cell element of ~~the previous claims~~ claim 1 wherein said anode shell is made of titanium or an alloy thereof, and said cathode shell is made of stainless steel, nickel or titanium.

Claim 10 (original) The cell element of claim 9 wherein said anode is a foraminous titanium structure coated with noble metals or noble metal oxides on at least one surface thereof.

Claim 11 (currently amended) The cell element of ~~claims 9 or 10~~ claim 9 wherein said anode shell is put in contact with the cathode shell of the adjacent cell element in the cell array with at least one bimetallic strip interposed therebetween.

Claim 12 (original) The cell element of claim 11 wherein said at least one bimetallic strip is welded to at least one of said cathode shell and said anode shell.

Claim 13 (currently amended) The cell element of claim 12 wherein said at least one bimetallic strip is welded to said anode shell in correspondence of said at least one conducting protrusion.

Claim 14 (original) The cell element of claim 13 wherein said at least one bimetallic strip and said at least one conducting protrusion are welded to said anode shell in a single step.

Claim 15 (currently amended) The cell element of ~~the previous claims~~ claim 1 wherein said insulating diaphragm forms a full face gasket contributing to the hydraulic seal between said anode shell and said cathode shell at least in the peripheral portion thereof.

Claim 16 (original) The cell element of claim 15 wherein said insulting diaphragm is provided with an additional insulating mask in correspondence of the regions contacting the outer edges of said anode and/or the vertical edges of said at least one draft tube.

Claim 17 (currently amended) The cell element of ~~the previous claims~~ claim 1 wherein said insulating diaphragm is made of a woven fabric.

Claim 18 (original) The cell element of claim 17 wherein said fabric is woven as a plain or as a reverse Dutch weave.

Claim 19 (original) The cell element of claim 18 wherein said fabric has a ratio of weft wire to warp wire diameter comprised between 1.15 and 1.5.

Claim 20 (original) The cell element of claim 19 wherein said fabric has a ratio of weft wire to warp wire diameter of about 5:4.

Claim 21 (currently amended) The cell element of ~~claims 17 to 20~~ claim 17 wherein the ratio of warp wire spacing to warp wire diameter is greater than 3.

Claim 22 (currently amended) The cell element of ~~claims 17 to 21~~ claim 17 wherein said woven fabric has a thickness comprised between 0.4 and 0.6 mm.

Claim 23 (currently amended) The cell element of ~~claims 17 to 22~~ claim 17 wherein said fabric is a polyester fabric.

Claim 24 (original) The cell element of claim 10 wherein said insulating diaphragm is obtained by applying an insulating coating to the surface of said foraminous titanium anode opposed to said at least one surface coated with noble metals or noble metal oxides.

Claim 25 (original) The cell element of claim 24 wherein said insulating coating is a ceramic coating.

Claim 26 (original) The cell element of claim 25 wherein said ceramic coating is selected from the group consisting of valve metal oxides and silicon carbide.

Claim 27 (original) The cell element of claim 26 wherein said ceramic coating is applied by plasma spraying.

Claim 28 (original) The cell element of claim 24 wherein said insulating coating comprises a fluorinated polymeric material.

Claim 29 (currently amended) The cell element of ~~the previous claims~~ claim 1 wherein said at least one draft tube is a rectangular-shaped tube.

Claim 30 (currently amended) The cell element of claim 29 wherein said rectangular-shape tube is made of a corrosion of resistant metal, preferably stainless steel or titanium.

Claim 31 (original) The cell element of claim 30 wherein said metallic rectangular-shaped tube is provided with an insulating outer coating and/or with foam tape at least on the two major surfaces thereof parallel to said anodic plate and said cathodic plate.

Claim 32 (currently amended) The cell element of ~~claims 29 to 31~~ claim 29 wherein the depth of said rectangular shaped tube is equivalent to the distance between said cathodic plate delimiting said cathode shell and said diaphragm.

Claim 33 (currently amended) The cell element of ~~claims 29 to 32~~ claim 29 wherein the bottom of said at least one draft tube is provided with an enlarged entry with respect to the tube width.

Claim 34 (currently amended) The cell element of ~~claims 29 to 33~~ claim 29 wherein said at least one draft tube is provided with arrowhead shaped elements located in its lower part, the angle thereof with the horizontal being comprised between 60 and 80° and preferably equivalent to about 70°.

Claim 35 (currently amended) The cell element of ~~the previous claims~~ claim 1 wherein said at least one draft tube comprises a base provided with at least one nozzle for feeding the electrolyte, thereby generating a motion capable of establishing said spouted bed of metallic beads.

Claim 36 (original) The cell element of claim 35 wherein said at least one nozzle is a double nozzle comprising an outer portion located at the base of the cell and an inner portion extending within or near the entrance of said at least one draft tube.

Claim 37 (currently amended) The cell element of claim 35 ~~or 36~~ wherein said inner portion of the double nozzle is provided with perforations allowing the passage of electrolyte and hindering the passage of said metallic beads.

Claim 38 (currently amended) The cell element of ~~the previous claims~~ claim 1 further comprising at least one deflector placed over the top of said at least one draft tube suitable for controlling the height of said spouted bed.

Claim 39 (original) The cell element of claim 38 wherein said at least one deflector is generally rooftop-shaped.

Claim 40 (currently amended) The cell element of claim 38 ~~or 39~~ wherein said at least one deflector is provided with holes allowing the free passage of electrolyte and hindering the passage of said metallic beads.

Claim 41 (currently amended) The cell element of ~~the preceding claims~~ claim 1 further provided with a bead over-flow system comprising at least one weir placed at an adjacent height to the top of said at least one draft tube and a tank for collecting the over-flowed beads.

Claim 42 (original) The cell element of claim 41 wherein said tank is provided with means for discharging said over-flowed beads from the bottom.

Claim 43 (currently amended) The cell element of claim 41 ~~or 42~~ wherein said tank has a cone-shaped bottom.

Claim 44 (currently amended) The cell element of ~~the previous claims~~ claim 1 further comprising an electrolyte drain tube provided with a filter element allowing the discharge of the electrolyte from the cell while preventing the discharge of said metallic beads.

Claim 45 (currently amended) The cell element of ~~the previous claims~~ claim 1 further comprising a bead drain device for discharging said metal beads therefrom provided with a drainage tube and a Tee-shaped separation element fed with electrolyte in the horizontal leg thereof.

Claim 46 (currently amended) An array of stacked electrowinning cell elements, each comprising an anode shell delimited by an anodic plate and a cathode shell delimited by a cathodic plate and including a draft tube establishing a spouted bed of metal beads, said anodic plate contacting the cathodic plate of the adjacent cell in the array.

Claim 47 (original) The array of claim 46 wherein said anodic plate contacts said cathodic plate of said adjacent cell by means of a bimetallic contact strip.

Claim 48 (currently amended) The array of ~~claims 46 or 47~~ claim 46 wherein said anode shell and said cathode shell of each cell element are mutually fastened before stacking the cell elements.

Claim 49 (currently amended) The array of ~~claims 46 to 48~~ claim 46 wherein the cell elements are cell elements of ~~claims 1 to 45~~ claim1.

Claim 50 (currently amended) A method for the electrowinning of a metal comprising feeding metallic beads in the cathodic compartment of a cell element of ~~claims 1 to 45~~ claim 1, putting said beads in electrical contact with said cathodic plate, and engaging said beads subjected to a cathodic potential in a spouted bed under the action of a metal ion bearing electrolyte supplied through said at least one draft tube.

Claim 51 (original) The method of claim 50 wherein said spouted bed is formed by at least one bead filled generally rectangular-shaped annulus disposed on one side of said at least one draft tube.

Claim 52 (original) The method of claim 50 wherein said spouted bed is formed by two bead filled generally rectangular-shaped annuli disposed on the opposite sides of said at least one draft tube.

Claim 53 (currently amended) The method of claim 51 ~~or 52~~ wherein said two bead filled rectangular-shaped annuli allow the self-formation of moving cones of beads filling the lower corners of said cathode shell and allowing the natural formation of bead flow channels into the vertical gap below the base of said at least one draft tube.

Claim 54 (currently amended) The method of ~~claims 50 to 53~~ claim 50 wherein said metal to be electrowon is selected from the group consisting of copper, tin, manganese, zinc, nickel, chromium and cobalt.

Claim 55 (cancelled)